

Amendments to the Specification

IN THE ABSTRACT OF THE DISCLOSURE

Attached hereto is a replacement Abstract with markings to show amendments.

IN THE WRITTEN DESCRIPTION

Please replace paragraph [0001] with the following amended paragraph:

**[0001]** This invention relates to a method for producing an electrolytic copper foil, and more particularly a copper electrolytic solution used in the production of an electrolytic copper foil that can be finely patterned and has excellent elongation and tensile strength both at ordinary ~~temperature~~ and high ~~temperature~~ temperatures.

Please replace paragraph [0002] with the following amended paragraph:

**[0002]** An electrolytic copper foil is generally produced as follows. A rotating metal cathode drum with a polished surface is used along with an insoluble metal anode that surrounds said cathode drum and is disposed at a position substantially corresponding to the lower half of said cathode drum, a copper electrolytic solution is allowed to flow between the cathode drum and the anode, a potential differential is provided between these to electrodeposit copper ~~te onto~~ the cathode drum, and the electrodeposited copper is peeled away from the cathode drum at the point of reaching a specific thickness, so that a copper foil is produced continuously.

Please replace paragraph [0004] with the following amended paragraph:

**[0004]** Fig. 1 is a simplified diagram of a conventional apparatus for producing a copper foil. This electrolytic copper foil production apparatus has a cathode drum 1

installed in an electrolysis bath containing an electrolytic solution. This cathode drum 1 is designed to rotate while being partially submerged (substantially the lower half) in the electrolytic solution.

Please replace paragraph [0010] with the following amended paragraph:

**[0010]** On the other hand, the performance needed in a copper foil used for printed wiring boards is not just its elongation at ordinary temperature, but also its high-temperature characteristics for preventing cracking caused by thermal stress, as well as high tensile strength for good dimensional stability in a printed wiring board. However, ~~a~~-copper ~~foils~~foil in which the ~~dumps~~bumps and pits of the rough surface side are severe as mentioned above has the problem of being totally unsuited to fine patterning, as discussed above. Because of this, smoothing the rough side to a low profile has been investigated.

Please replace paragraph [0012] with the following amended paragraph:

**[0012]** Nevertheless, a problem with such additives is that they sharply decrease the elongation at ordinary ~~temperature~~ and high ~~temperature~~temperatures, which greatly lowers the performance of the copper foil when used for a printed wiring board.

Please replace paragraph [0015]-[0017] with the following amended paragraph:

**[0015]** It is an object of the present invention to provide a copper electrolytic solution used to obtain a low-profile electrolytic copper foil with low surface roughness on the rough side (the opposite side from the glossy side) in the production of an electrolytic copper foil using a cathode drum, and more particularly to provide a copper electrolytic solution used to obtain an electrolytic copper foil that has

reduced transmission loss at a high frequency, can be finely patterned, and has excellent elongation and tensile strength both at ordinary ~~temperature~~ and high ~~temperature~~ temperatures.

[0016] The inventors learned that if optimal additives that afford a lower profile are added to an electrolytic solution, fine patterning will be possible and an electrolytic copper foil can be obtained with excellent elongation and tensile strength at both ordinary ~~temperature~~ and high ~~temperature~~ temperatures.

[0017] Based on this finding, the inventors examined additives that are added to an electrolytic solution in an electrolytic copper foil producing method in which a copper electrolytic solution is allowed to flow between a cathode drum and an anode, copper is electrodeposited on the cathode drum, and the electrodeposited copper foil is peeled away from the cathode drum to continuously produce a copper foil. As a result, they arrived at the present invention upon discovering that if electrolysis is performed using a copper electrolytic solution containing an organic sulfur compound and a quaternary amine compound with a specific structure, fine patterning will be possible and an electrolytic copper foil can be obtained with excellent elongation and tensile strength at both ordinary ~~temperature~~ and high ~~temperature~~ temperatures.

Please replace paragraph [0025] with the following amended paragraph:

[0025] In the present invention, it is important that the copper electrolytic solution contain (A) at least one quaternary amine salt selected from the group consisting of (a) quaternary amine salts obtained by a reaction between epichlorohydrin and an amine compound mixture composed of a secondary amine compound and a tertiary amine compound, and (b) polyepichlorohydrin quaternary amine salts obtained by subjecting epichlorohydrin to ring-opening polymerization and then reacting this product with a tertiary amine compound, and (B) an organic sulfur compound. The object of the present

invention will not be achieved by adding just one or the other of these.

Please replace paragraph [0031] with the following amended paragraph:

**[0031]** The ratio between the secondary amine compound and tertiary amine compound in the amine mixture is preferably such that secondary amine compound:tertiary amine compound = 5:95 to 95:5 (mol%). The ratio in which the epichlorohydrin and the amine mixture are reacted is preferably such that the epichlorohydrin:amine mixture (tertiary amine compound + secondary amine compound) = 1:2 to 2:1 (mol%).

Please replace paragraph [0038] with the following amended paragraph:

**[0038]** Also, the copper-clad laminated board obtained by laminating the electrolytic copper foil of the present invention has excellent smoothness and excellent elongation and tensile strength at both ordinary ~~temperature~~ and high ~~temperature~~temperatures, and is therefore a copper-clad laminated board that is suited to fine patterning.